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Single reel tape cartridge.

A magnetic tape cartridge (11) is shown in which a length of magnetic tape (12) is wound on a reel hub (10) with the free end of the tape permanently connected to a generally rectangular-shaped leader block (13). The cartridge completely surrounds the reel of magnetic tape except for an opening (16) provided at one corner of the cartridge (11). This opening (16) permits tape (12) wound on the reel to be unwound as the leader block is moved away from the cartridge, preferably by an automatic threading mechanism. The cartridge comprises a leader block receiving well in which the leader block (13) is a snug fit. The bottom wall (51) of the well has the opening (16) in it through which the tape enters and leaves the cartridge. The walls (53, 33) of the leader block well are arranged to engage the leading and trailing surfaces of the leader block in a clamping relationship and help retain the block in the well in a position in which the opening (16) in the cartridge is substantially sealed by the leader block to prevent contamination from entering the cartridge when the cartridge is not in use.
The invention relates to single reel cartridges for magnetic tape and, in particular, to such cartridges in which a leader block is attached to the free end of the tape.

It is desirable to prevent contamination from entering a magnetic tape cartridge since it would interfere with subsequent reading and writing of information on the magnetic tape. Contamination arises either from external sources or from internal sources, such as when the tape slides over a guiding surface. It will be recognized that the tape path from the reel to a guiding surface external of the cartridge will vary as a function of the amount of tape wound on the reel and the distance to the first guiding surface. Where the guiding surface is external to the cartridge, the height of the opening through which the tape passes in exiting the cartridge should be sufficient to prevent the tape from rubbing when the reel is either fully wound or fully unwound. The window size in the side of the cartridge to permit tape extraction is, therefore, generally determined by the width of the tape and the height necessary to prevent rubbing. It has been recognized that as the area of the window increases, the chance for external contamination entering the cartridge increases unless some type of sealing arrangement is provided. We have found that, where a leader block is attached to the free end of the tape for the purpose of threading the tape through the tape path, the leader block and cartridge can be constructed and arranged so that the leader block functions as a seal for the section of the cartridge from which the tape exits.

Accordingly the invention provides a single reel magnetic tape cartridge containing a reel of tape with its free end projecting out of the cartridge through an opening in the peripheral wall of the cartridge, said free end being permanently anchored to a leader block accessible externally of the cartridge, said cartridge being characterised in that the opening is formed through the bottom wall of a housing provided on the cartridge, into which housing the leader block is drawn as the tape is wound into the
cartridge and which locates the leader block in a position in which it covers the opening when the tape is fully wound into the cartridge and prevents the entry of contaminates into the cartridge.

The invention also provides a magnetic tape cartridge in which a length of magnetic tape is wound on a single reel with the free end of the tape permanently connected to a generally rectangular shaped leader block, said cartridge completely surrounding said reel of magnetic tape except for an opening provided at one corner of said cartridge which permits tape wound on said reel to be unwound as said leader block is moved away from said cartridge, said cartridge characterised by the corner of said cartridge through which said tape passes having a leader block receiving well including a bottom wall which defines the opening in said cartridge through which said tape moves and including other opposed walls attached to said bottom wall for engaging the leading and trailing surfaces of said leader block in a clamping relationship whereby said cartridge is substantially sealed from contamination by said leader block overlying said opening when said cartridge is not in use.

A tape cartridge embodying the present invention will now be described by way of example with reference to the accompanying drawings, in which:

FIG. 1 is a plan view of a single reel magnetic tape cartridge embodying the present invention;

FIG. 2 is a perspective view of the tape cartridge shown in FIG. 1 with a portion of the cartridge broken away to show the window well and sills;

FIGS. 3a through 3c are schematic views illustrating the movement of the leader block between the home position and a position where tape is being extracted.
The cartridge shown in FIG. 1 is generally rectangular in shape except for one corner of the cartridge which is angled approximately 45° relative to the adjacent sides to provide a shorter fifth side in which a leader block window is constructed. As shown, the cartridge includes the reel hub 10, the casing 11, the tape 12, and the leader block 13. Tape exits from the cartridge 11 through window opening 16 when the leader block 13 is moved in the direction of arrow 17. Opening 16 is sealed off when the leader block is snapped into the leader block well 19.

The leader block 13 can be viewed generally as a rectangular block provided with two pairs of opposed surfaces. A slot 24 extends normal to surfaces 20T and 20B. A pin 25 is inserted into the slot which together functions to attach the tape 12 to the leader block 13. The surfaces 21L and 21R are generally parallel to the plane of the tape surface and the axis of the tape reel. One end 27 of block 13 is also provided with means for engaging an automatic threading apparatus which may be of the type shown in copending application No. 81104238.1, published under the number 42989. As shown therein, the leader block is provided with an opening into which a pin on the automatic threading device is positioned. Leader block 13, as shown, is provided with a slot 29 which corresponds generally to the pin receiving slot shown in the copending application. The surface 30, as shown, is slightly cylindrical and is provided with a rounded boss 31 which engages an incline surface 34 of the leader block well 19 disposed in the cartridge. The opposite, or trailing, surface 32 of the block 13 may also be slightly cylindrical to mate with the surface 33 which is similarly shaped.

The surface which defines the sills for the window for permitting exiting of the tape from the cartridge can also be seen in FIG. 2 which illustrates in perspective one corner of the cartridge in which the leader block well is disposed. As shown in FIG. 2, the window 16 is disposed in surface 51 which extends at an angle of approximately 45° between side 53 and side 54 of the cartridge. The bottom of the window is defined by edge 56. As seen in FIG. 2, the left edge 57 of the window is also visible. The opposite edge is not shown. The top of the window is defined by the internal surface edge 55 since surface 33, which extends from the top surface 54 of the cartridge also at an angle of 45°,
intersects surface 51. The surfaces 51 and 33, therefore, are disposed at an angle of approximately 90° relative to each other, as shown in FIG. 1. As previously mentioned, surface 33 is slightly rounded to cooperate with the end 32 of the leader block 13.

FIGS. 3a through 3c illustrate schematically the movement of the leader block 13 from a home position in well 19 of the cartridge to a position where the leader block is pulling tape through the opening 16.

FIG. 3a illustrates the leader block snugly positioned in well 16 with the rounded boss 31 engaging surface 34 of side 53 urging the leader block towards the surfaces 33 and 51. This is the home position of the leader block 13. In this home position the leader block 13 is within the cartridge and the risk of accidental damage to it is greatly reduced.

FIG. 3b illustrates the position of the leader block 13 in which the block has been pivoted about the rounded surface 60 of the cartridge as a result of a pulling force acting in the direction of arrow 61 through the imaginary axis 62 in the leader block slot 29. The force may originate as previously mentioned from an automatic threading apparatus of the type described in the copending application or some other suitable prior art means which forms no part of the present invention.

FIG. 3c illustrates the position of the leader block 13 out of the well 16 and moving in a direction which unwinds tape 12 from reel 10.

During rewinding, the leader block 13 follows the same path, but in the opposite direction, as the reel is rotated in a clockwise direction, as shown in FIG. 1.

While the invention has been particularly shown and described with reference to a preferred embodiment thereof, it will be understood by those skilled in the art that various other changes in the form and details may be made therein without departing from the scope of the invention.
1. A single reel magnetic tape cartridge containing a reel of tape with its free end projecting out of the cartridge through an opening in the peripheral wall of the cartridge, said free end being permanently anchored to a leader block accessible externally of the cartridge, said cartridge (11) being characterised in that the opening (16) is formed through the bottom wall (51) of a housing (19) provided on the cartridge, into which housing the leader block (13) is drawn as the tape (12) is wound into the cartridge and which locates the leader block (13) in a position in which it covers the opening (16) when the tape is fully wound into the cartridge and prevents the entry of contaminates into the cartridge.

2. A cartridge as claimed in claim 1, in which the leader block is of generally rectangular shape, characterised in that the housing (19) is provided as a well-like structure comprising a bottom (51), side and end walls (33, 53) dependant from an access gap in the periphery of the cartridge, in that the opening (16) is provided in the bottom wall (51), and in that the well-like structure is of generally rectangular shape similar to the leader block (13) so that the leader block is a snug fit therein.

3. A cartridge as claimed in claim 2, further characterised in that the end walls (33, 53) are profiled and spaced so that the block is resiliently clamped therebetween.

4. A cartridge as claimed in claim 1, 2 or 3, further characterised in that the cartridge is of a generally rectangular, six-sided box-like structure except for one corner (Fig. 2) where a triangular portion is omitted to form a gap between edges (34, 60) of two adjacent sides of the cartridge and in that the tape passes through the gap.
5. A magnetic tape cartridge in which a length of magnetic tape is wound on a single reel with the free end of the tape permanently connected to a generally rectangular shaped leader block, said cartridge completely surrounding said reel of magnetic tape except for an opening provided at one corner of said cartridge which permits tape wound on said reel to be unwound as said leader block is moved away from said cartridge, said cartridge characterised by the corner of said cartridge through which said tape passes having a leader block receiving well (19) including a bottom wall (51) which defines the opening (16) in said cartridge through which said tape (12) moves and including other opposed walls (33, 53) attached to said bottom wall (51) for engaging the leading and trailing surfaces (31, 32) of said leader block (13) in a clamping relationship whereby said cartridge is substantially sealed from contamination by said leader block overlying said opening (16) when said cartridge is not in use.

6. The cartridge defined in claim 1 further characterised by a generally rectangular, six-sided, box-like structure except for said one corner and wherein said bottom surface of said leader block receiving well is disposed at an angle of approximately 45° relative to the pair of peripheral sides joining at the corner.
## DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of relevant passages</th>
<th>Relevant to claim</th>
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<tbody>
<tr>
<td>Y</td>
<td>US - A - 3 169 721 (PHILIPS) * column 4, lines 22 to 38; fig. 1, 2 *</td>
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<td>Y</td>
<td>DE - U - 1 899 166 (PHILIPS) * claim; page 4, paragraph 1; fig. 2 *</td>
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<td>Y</td>
<td>GB - A - 1 021 647 (PHILIPS) * page 2, lines 56 to 92; fig. 3 *</td>
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<td>A</td>
<td>DE - C - 862 060 (LOEWE OPTA AG) * page 3, line 119 to page 4, line 14 *</td>
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## CLASSIFICATION OF THE APPLICATION (Int. Cl.)

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## TECHNICAL FIELDS SEARCHED (Int.Cl.)

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## CATEGORY OF CITED DOCUMENTS

- **X**: particularly relevant if taken alone
- **Y**: particularly relevant if combined with another document of the same category
- **A**: technological background
- **O**: non-written disclosure
- **P**: intermediate document
- **T**: theory or principle underlying the invention
- **E**: earlier patent document, but published on, or after the filing date
- **D**: document cited in the application
- **L**: document cited for other reasons

The present search report has been drawn up for all claims.

**Place of search**: Berlin  
**Date of completion of the search**: 25-06-1982  
**Examiner**: LEITHÄUSER